

REMARKS

All non-elected claims have been canceled so that they can be presented in divisional applications. All independent claims have been amended to place them in condition for allowance. Applicants respectfully request entry of these amendments.

The Examiner rejected claim 14 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner acknowledges that changing the phrase “pyrolyzing the carbon” to “pyrolyzing the liquid carbon precursor” would overcome this rejection. Claim 14 has thus been amended in accordance with the Examiner’s suggestion.

The Examiner also rejected claims 14-16, 18-25, 33-40, 42 and 43 under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Luthra et al (5,962,103), for reasons of record. Although Applicants respectfully disagree with the Examiner’s conclusion, to expedite allowance of claims in the present application, Applicants have amended all of the pending independent claims by removing “ceramic fibers” from the markush group “a fibrous structure comprising carbon, polyacrylonitrile, rayon or ceramic fibers.” In contrast, Luthra et al. teaches a process beginning with ceramic fibers and thus does not disclose a composite made from such a fibrous structure. Neither does Luthra et al. disclose “initially predominately coating the fibers of [a] fibrous structure perform with elemental carbon.”

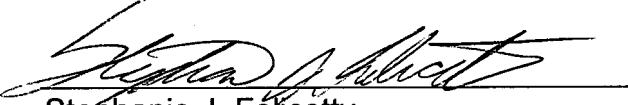
Moreover, it would not have been obvious to one of ordinary skill in the art to modify Luthra et al. to take a fibrous structure comprising carbon, polyacrylonitrile, or rayon, and then coat that structure with elemental carbon. Indeed, coating a carbon

fiber with additional carbon is counterintuitive. In particular, coating a carbon fiber with additional carbon and then forming a silicon carbide/silicon matrix by melt infiltration typically results in the silicon phase reacting with the carbon coating and the carbon fiber, resulting in a composite with different physical properties. See page 10, paragraph [0045] of Applicants' specification, noting the importance to the physical properties of the composite of avoiding a reaction between the silicon matrix and the underlying fibrous structure; and page 15, paragraph [0064], emphasizing that a reaction between the silicon and the CVD carbon and carbon fibers is undesirable and should be prevented. Applicants' claimed method does not result in such an undesirable reaction because the composite is made by infiltration with a liquid carbon precursor to form a carbon char, which preferentially reacts with the silicon to form silicon carbide, thereby protecting the carbon coating and fiber. See page 12, paragraph [0053] of Applicants' specification, describing the reaction of silicon with naphthalene char to form silicon carbide during melt infiltration. The composite made using this process includes a hybrid of a carbon-carbon composite and a ceramic matrix composite reinforced with carbon fiber. In contrast, Luthra et al. produces a ceramic matrix composite reinforced with ceramic fiber, which uses a second barrier coating (such as silicon carbide) to avoid such an undesirable reaction. See, e.g., Luthra et al., col. 11, claims 6-7. Thus, Applicants' claimed method produces a composite having an entirely different structure than the composite disclosed by Luthra et al. Further, as explained in Applicants' specification, Applicants' claimed method produces a composite with physical properties surprisingly superior to those of the Luthra et al. composite. See, e.g., page 19, paragraph [0077] of Applicants' specification, referring

to the reduced wear rate and improved static friction coefficient of the invention. Thus, Luthra et al. does not teach or suggest Applicants' claimed composite. The Examiner's 102 and 103 rejections should thus be withdrawn and the application deemed in condition for allowance.

If, for any reason, the Examiner feels that the above amendments and remarks do not put the claims in condition for allowance, he is requested to contact the undersigned attorney at (312) 222-8105 to resolve any remaining issues.

Respectfully submitted,



Stephanie J. Felicetti
Registration No. 50,814
Attorney for Applicants

BRINKS HOFER GILSON & LIONE
P.O. Box 10395
Chicago, IL 60610
(312) 321-4200